

1. *Image classification by logistic regression.*

Compute the logistic regressor using gradient descent methods.

Assignment: Your task is to fill in the blank in the code `logistic_regression`. Specifically, you need to compute the coefficient $x \in \mathbb{R}^{785}$ of the logistic regressor, using the m training examples. We will use gradient descent methods to solve the optimization problem for the coefficient x . More detailed descriptions of the tasks are as follows.

- Do the image classification task for digits 0 and 1, using $m = 60,000$ training examples, respectively. Plot the convergence result, namely $f(x^{(k)}) - p^*$ versus iteration k . Report the accuracy of the logistic regressor.
- Do the above tasks for the image classification for digits 5 and 6.